REMARKS

The present Amendment amends claim 19 and leaves claims 20-23 unchanged. Therefore, the present application has pending claims 19-23.

The Examiner is respectfully requested to contact Applicant's attorney by telephone to schedule an interview to discuss the outstanding issue of the present application.

Claims 19-23 stand rejected under 35 USC §112, first paragraph as allegedly failing to comply with the written description requirement. Particularly, the Examiner alleges that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors at the time the application was filed had possession of the claimed invention. The present Amendment amends the claims so as to correct the language therein to bring the claims into conformity with the requirements of 35 USC §112, first paragraph. Therefore, the Examiner's rejection of claims 19-23 under 35 USC §112, first paragraph is overcome. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Claims 19-23 stand rejected under 35 USC §102(e) as being anticipated by Otterness (U.S. Patent No. 6,460,120). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 19-23 are not taught or suggested by Otterness whether taken individually or in combination with any of the other references of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

The present invention is directed to a storage system having a plurality of clusters and a communication path which connects each of the clusters. As per the present invention each cluster includes a disk controller and a plurality of disk drives wherein the controller of each cluster includes a disk interface which connects to the disk drive of the cluster, a cache memory and a control memory which has stored therein a cache management table. The cache management table according to the present invention indicate relationships between identifications of disk controllers, addresses of the disk drives connected to the disk controllers, and addresses in the cache memories at which data of the disk drives are stored.

Thus, according to the present invention when a first disk controller of a first clusters receives from a host computer each write request which requests writing of updated data for updating data stored in the disk drives of a second controller of a second cluster, the first disk controller checks whether data to be updated by the updated data is stored in the cache memory of the second disk controller by referring to the cache management table and if the data to be updated is not stored in the cache memory of the second disk controller, the first disk controller sends the write request to the second disk controller via the communication path.

Further, according to the present invention, in response to the write request from the first disk controller and when the data to be updated is not stored in the cache memory of the second disk controller, the second disk controller updates the data to be updated which is stored in the disk drives of the second disk controller by writing the updated data in the disk drives of the second disk controller via the disk interface based on the write request.

The present invention as described above as now more clearly recited in the claims provides unique advantages over conventional apparatus being that each of the disk controllers can easily identify by use of the cache management table whether data has been cached in a cache memory of another disk controller, thereby allowing for ease in obtaining coherence between the cache memories.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by Otterness.

Otterness teaches an apparatus including a multiple level cache structure that distributes I/O processing loads including caching operations between processors. Particularly, Otterness teaches, for example, as illustrated in Fig. 3, that the system includes a controller store RAM having stored therein application code, cache line descriptors for local and primary caches and local cache lines.

However, at no point is there any teaching or suggestion in Otterness which allows for the disk controller of a first cluster to determine whether data is cached in the disk drives connected to a second disk controller of another cluster as in the present invention. As described above, the present invention accomplishes this by providing a cache management table such as that illustrated in Fig. 2 of the present application which indicates relationships between identifications of disk controllers, addresses of the disk drives connected to the disk controllers and addresses in the cache memories at which data of the disk drives are stored. Such features are clearly not taught or suggested Otterness.

Otterness teaches, for example, in col. 9, lines 22-27, col. 10, lines 44-61, col. 11, lines 1-6, 15-18 and 36-45 and col. 12, lines 1-3, 12-26, and 34-38 that cache line descriptors are provided which includes parameters or pointers which identifies system drive and sector and the number of blocks to which data is stored. The Examiner's attention is particularly directed to the above noted passages of Otterness since it appears the Examiner may have mis-described the invention therein. At no point is there any teaching or suggestion in Otterness that the cache line descriptors includes information indicating relationships between identifications of disk controllers, addresses of the disk drives connected to the disk controllers and addresses in the cache memories at which of the disk drives are stored as in the present invention.

Thus, Otterness fails to teach or suggest that when a first disk controller of a first cluster receives from a host computer each write request which requests writing of updated data for updating data stored in disk drives of a second disk controller of a second cluster, the first disk controller checks whether data to be updated by the updated data is stored in the cache memory of the second disk controller by referring to a cache management table as recited in the claims.

Further, there is no teaching or suggestion in Otterness that a cache management table is provided that indicates relationships between identifications of disk controllers, addresses of the disk drives connected to the disk controllers, and addresses in the cache memories at which data of the disk drives are stored as recited in the claims.

Therefore, as is quite clear from the above, the features of the present invention as now more clearly recited in the claims are not taught or suggested by Otterness whether taken individually or in combination with any of the other references of record. Accordingly, reconsideration and withdrawal of the 35 USC §102(e) rejection of claims 19-23 as being anticipated by Otterness is respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the reference utilized in the rejection of claims 19-23.

In view of the foregoing amendments and remarks, applicants submit that claims 19-23 are in condition for allowance. Accordingly, early allowance of claims 19-23 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (520.39648X00).

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.

Carl I. Brundidge
Registration No. 29,621

CIB/jdc
(703) 684-1120